

What is claimed is:

- 5
1. A method for loading a plurality of disparate sample containers, the sample containers comprising an integral structure, such that the concentration of a specified substance in each container is characterized by a gradient with respect to position of the container within the structure, the method comprising:
- 10
- a. introducing a first liquid into the disparate containers; and
- b. contacting the containers with a second liquid, the second liquid containing the specified substance, in such a manner that the degree of diffusion of the specified substance into the disparate containers differs in a controlled manner among the containers.
- 15
2. A method according to claim 1, wherein contacting the containers with the second liquid includes differing a duration of contact with the second liquid as among the disparate containers.
- 20
3. A method according to claim 1, wherein contacting the containers with the second liquid includes modulating the diffusion rate of the specified substance into the containers.
- 25
4. A method according to claim 3, further comprising the step of creating a gradient of the specified substance in the second liquid prior to contacting the containers with the second liquid.
5. A method according to claim 4, wherein the step of creating a gradient of the specified substance includes applying electrophoresis.
- 30
6. A method according to claim 3, wherein the step of modulating the diffusion rate includes contacting the containers with the second liquid through a

membrane having a permeability variable with respect to position.

7. A method according to claim 1, wherein the step of introducing a first liquid into the disparate containers includes filling a platen having a plurality of through-holes.

8. A method for loading a liquid into a plurality of through-holes of a platen, the platen having a top surface, the top surface having an opening to each through-hole, the method comprising:

- a. forming a droplet of the liquid on the end of a liquid transfer device;
- b. moving the fluid transfer device so as to drag the droplet across the top surface of the platen and over the through-holes to be filled;
- c. dispensing the liquid in such a manner as to keep the droplet from being depleted; and
- d. withdrawing the droplet from the surface after the through-holes are filled.

9. A method for loading a liquid sample into a plurality of through-holes of a platen, the method comprising:

- a. filling a plurality of capillary tubes having dispensing ends, the capillary tubes comprising an array;
- b. disposing each dispensing end in proximity to a distinct through-hole; and
- c. transferring liquids to the through-holes of the platen through the capillary tubes.

10. A method for loading a plurality of sample containers, the sample containers comprising an integral structure, such that the concentration of a specified substance in each container is characterized by a gradient with respect to position of the container within the structure, the method comprising:

- a. creating regions of distinct concentration of the specified substance in a liquid, the liquid having a surface; and
- b. transferring into distinct containers the liquid from the distinct regions.

5 11. A method according to claim 10, wherein the step of creating regions of distinct concentration includes applying electrophoresis.

12. A method according to claim 10, wherein the step of transferring liquid includes transporting the liquid through capillary tubes.

10

13. A method according to claim 10, wherein the step of transferring the liquid includes contacting the integral structure with the surface of the liquid.

15

14. A method for manufacturing a platen having two substantially parallel planar surfaces and a plurality of through-holes disposed substantially perpendicularly to the planar surfaces, the method comprising:

- a. providing a sheet of thermoplastic material;
- b. loading the sheet of thermoplastic material into contact with a surface of a die having a plurality of holes; and
- c. bringing a punch having a plurality of protrusions of specified cross-section into contact with the sheet of thermoplastic material in such a manner that the protrusions are in alignment with the holes of the die such that through-holes are cut through the thermoplastic material.

20

25 15. A method for manufacturing a platen having two substantially parallel planar surfaces and a plurality of through-holes disposed substantially perpendicularly to the planar surfaces, the method comprising:

- a. providing a sheet of electrically conducting material;
- b. loading the sheet of conducting material into contact with a surface of a

30 die having a plurality of holes; and

- c. bringing an EDM mandrel having a plurality of protrusions of specified cross-section into proximity of the sheet of conducting material in such a manner that the protrusions are in alignment with the holes of the die such that through-holes are cut through the conducting material.

5

16. A method for providing a hydrophobic coating to a silicon platen having a first and a second surface, the surfaces being substantially parallel, and a plurality of through-holes substantially perpendicular to the surfaces, the method comprising:

10

- a. oxidizing the first surface;
- b. cleaning the oxidized first surface;
- c. applying a positive pressure of inert gas to the plurality of through-holes from the direction of the second surface; and
- d. exposing the first surface to a silanizing vapor agent.

15

17. A method for loading a liquid into a plurality of through-hole platens, each platen having a plurality of through-holes, the method comprising:

20

- a. stacking at least two platens together in such an adjacent manner that at least one of the plurality of through-holes from each platen is registered with a through-hole of each other adjacent platen so as to form at least one continuous channel; and
- b. transferring the liquid into each continuous channel.

25

18. A method according to claim 17, wherein each platen is separated from each adjacent platen by an air gap.

19. A method according to claim 17, wherein the step of transferring liquid includes transporting the liquid through capillary tubes.

30

20. A method according to claim 17, wherein the step of transferring liquid

includes transporting the liquid through at least one cannula.

21. A method for mixing liquid in at least two platens, each platen having a plurality of through-holes, the method comprising stacking at least two platens together for a specified time, in such a manner that at least one of the plurality of through-holes from each platen connects with a corresponding through-hole of another platen such that liquid is allowed to diffuse between connecting through-holes.
22. A method according to claim 21, further including the step of separating the at least two platens after mixing of the liquid between the connecting through-holes.
23. A microlens array for diffusing light, the microlens array comprising,
- a. a microchannel plate having a plurality of parallel microchannels; and
  - b. a liquid disposed within substantially each of the plurality of the parallel microchannel.
24. A method for humidifying a system, the method comprising,
- a. filling a microchannel plate with a liquid having a plurality of parallel microchannels; and
  - b. placing the filled microchannel plate in vicinity of the system to be humidified.
25. A method for diffusing light, the method comprising:
- a. entraining a fluid in substantially each of a plurality of parallel microchannels having proximal and distal ends, the microchannels comprising a microchannel plate;
  - b. illuminating the proximal end of each of the plurality of parallel microchannels with light; and

c. allowing diffuse light to emanate from the distal ends of the microchannel.

26. A perforated platen having substantially parallel planar surfaces for

5 manipulating distinct liquid samples, each sample having a volume less than 1 microliter, the platen comprising:

a. an inner layer of hydrophilic material;

b. two outer layers of hydrophobic material coupled to opposite sides of the inner layer; and

10 c. a two-dimensional array of through-holes, at least two holes having distinct volumes, for retaining the distinct liquid samples, the through-holes each having a diameter less than 300 micrometers and traversing the inner layer and the two outer layers in a direction substantially perpendicular to the planar surfaces of the platen.

15